

REMARKS

The Office has rejected claims 1-6, 8-10, 14, 15, 17 and 18 under 35 U.S.C. §103(a) over the combination of Falbe (GB Patent No. 1,170,226) and Becker (U.S. Patent No. 5,728,893). In addition, the Office has rejected claims 7, 11-13, 16 and 19 under 35 U.S.C. §103(a) over the combination of Lukas (U.S. Patent No. 5,041,675) and Becker. Applicants submit that the claimed process would not have been rendered unpatentable over the combination of the cited references because the cited references do not teach or suggest all the recitations of the claimed process and because the cited references teach away from the claimed process.

The disclosure involves processes for preparing tricyclodecanedialdehyde, diaminomethyltricyclodecane and tricyclodecanedimethanol. The processes involve hydroformylation carried out at a pressure of from 200 to 350 bar in at least two reaction zones, with a reaction temperature of from 80 to 120°C in a first reaction zone and a reaction temperature of from 120 to 150°C in a subsequent reaction zone with the proviso that the reaction temperature in the subsequent reaction zone is at least 5°C higher than in the first reaction zone. With regard to claims 2, 8 and 11, the hydroformylation is carried at a concentration of the rhodium catalyst, calculated as Rh, of from 2 to 20 ppm by weight in the hydroformylation medium. Applicants note that the cited references do not teach or suggest these recitations; and therefore, the claimed process would not have been obvious over the combination of the cited references.

The rejection of claims 1-6, 8-10, 14, 15, 17 and 18 under 35 U.S.C. §103(a) over the combination of Falbe and Becker is respectfully traversed.

Falbe describes a process for the production of tricyclodecanedialdehydes and tricyclodecanedimethiols. The German counterpart to this British patent is DE-A 1618384 and is discussed in detail on pages 3 and 4 of the specification. As the Office notes on pages 2 and 3 of the Office Action, Falbe does not teach or suggest at least two reaction zones where temperature in a subsequent reaction zone is at least 5°C higher than in the first reaction zone. The Office relies on Becker to overcome this deficiency.

Becker describes a process for producing one or more products in a staged reactor having more than one reactive stage. Applicants note that Becker is concerned with metal-organophosphorus ligand complexes. Such catalysts complexes teach away from the recited rhodium catalyst which has not been modified by means of a ligand. Accordingly, there would be no motivation to combine Becker with Falbe because they use completely different catalyst systems. Nevertheless, Becker does not teach or suggest that the reaction temperature in the subsequent reaction zone is at least 5°C higher than in the first reaction zone. Indeed, Becker actually teaches away from the recited temperature conditions. In Example 1, Becker teaches that the temperature in the reaction zones go from 88°C in the bottom compartment to 86°C in the middle compartment to 83°C in the top compartment. In Becker, the temperature decreases not increases by at least 5°C as recited. Therefore, the claimed process would not have been obvious over the combination of Falbe and Becker. Accordingly, Applicants respectfully request that the Office withdraw the rejection of claims 1-6, 8-10, 14, 15, 17 and 18 under 35 U.S.C. §103(a) over Falbe and Becker.

With regard to claims 2 and 8, Applicants note that Falbe and Becker do not teach a rhodium catalyst which has not been modified by means of a ligand at a concentration of from 2 to 20 ppm (as Rh) by weight in the hydroformylation medium. Becker teaches a ligand containing catalyst (thus teaching away). Falbe utilizes 162 ppm Rh in Example 1 (0.203g Rh/1250g of medium = 162 ppm) which is an order of magnitude greater than the claimed process. Therefore, claims 2 and 8 would not have been obvious over the combination of Falbe and Becker.

The rejection of claims 7, 11-134, 16 and 19 under 35 U.S.C. §103(a) over the combination of Lukas and Becker is respectfully traversed.

The claimed process involves preparing diaminomethyltricyclodecane by hydroformylation of dicyclopentadiene with a rhodium catalyst which has not been modified by means of a ligand to form tricyclodecanedialdehyde then separating the rhodium catalyst from the tricyclodecanedialdehyde which is then reductively aminated to form diaminomethyltricyclodecane.

Lukas describes a process in which dicyclopentadiene is hydrogenated in the presence of a rhodium compound and then subjected to reductive animation without the (rhodium) hydroformylation catalyst being separated from the reaction mixture (abstract). Lukas clearly teaches away from the claimed process, and therefore, the claimed process would not have been obvious over Lukas and Becker.

In addition, as noted above with regard to Becker, Becker teaches away from the proviso that the reaction temperature in the subsequent reaction zone is at least 5°C higher than in the first reaction zone. Accordingly, the claimed process would not have been obvious over the combination of Lukas and Becker. Therefore, Applicants respectfully request that the Office withdraw the rejection of claims 7, 11-13, 16 and 19 under 35 U.S.C. §103(a) over the combination of Lukas and Becker.

In view of the above remarks, applicant believes the pending application is in condition for allowance. Favorable reconsideration is respectfully requested.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 03-2775, under Order No. 12810-00263-US1 from which the undersigned is authorized to draw.

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